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ABSTRACT

To survive in the 21st century, today's student must develop the thinking skills necessary to adapt to a transforming world and learn how to be a creative problem solver. Future Problem Solving (FPS) prepares the student of today for tomorrow through an educational program that enables students to apply a constructive, deliberate process for solving problems. The FPS approach, based on the Creative Problem Solving (CPS) framework, has three components: (1) understanding the problem; (2) generating ideas; and (3) planning for action. FPS provides competitions for which students identify a real-life need and use the FPS model to create a solution. As a curriculum program, FPS provides a framework for solving complex, real-life challenges. The foundation tools of the CPS process, creative thinking and critical thinking, must both be employed for the results to be productive. In July 1997, four Arizona FPS students and the Arizona FPS affiliate director presented FPS at the China-U.S. Conference on Education in Beijing. This paper describes the renewed partnership of FPS and CPS, student interpretations of FPS, and an overview of the Chinese and American students' problem-solving activity. (Author/EMK)

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Chapter Six

Future Problem Solving: Connecting the Present to the Future

Jennine B. Jackson, Lisa Crandell & Lorien Menhennett

Abstract

Future Problem Solving (FPS) prepares the student's of today for tomorrow through an educational program that enables students to learn and apply a constructive, deliberate process for solving problems. FPS, a competition and a curriculum program, incorporates a circular problem solving approach along with the linear model and is aligned with recent research and development in Creative Problem Solving (CPS). In July 1997, four Arizona FPS students and the AZFPS Affiliate Director presented FPS at the China-U.S. Conference on Education in Beijing. This paper describes the renewed partnership of FPS and CPS, student interpretations of FPS, and an overview of the Chinese and American students' problem solving activity.

Today's students will spend most of their lives in the 21st Century. As change continues to accelerate, the awesome burden of preparing students for the uncertainties of the new millennium faces educators, parents and the community. To survive in the future, students must develop the thinking skills necessary to adapt to a transforming world and learn how to be a creative problem solver. The Future Problem Solving Program (FPSP) assists students in connecting the present to the future by teaching thinking skills within a problem solving framework.

In July 1997 the Arizona Future Problem Solving Program's Affiliate Director and a four-member Arizona FPSP high school team gave a presentation at Global Interactions's first China-U.S. Conference on Education in Beijing, People's Republic of China. This paper is an extension of theFPSP presentation given by the director and the students.

The Future Problem Solving Program is an educational program created by Dr. E. Paul Torrance of the University of Georgia twenty-four years ago. This program began as a curriculum project for Clark High School in Athens, Georgia. Within the program Dr. Torrance addressed two concerns– decline in creativity and lack of awareness in the students of future trends. He based Future Problem Solving on the Creative Problem Solving process developed for business by Alex Osborn and Sidney Parnes over forty years ago. (Torrance,

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1976). Today's Future Problem Solving uses an approach closely aligned with the recent research and development on Creative Problem Solving. (Isaksen, Dorval, & Treffinger, 1994; Treffinger, Isaken, Dorval, 1994).

Students can participate in the Community Problem Solving competition, the Scenario Writing competition, or the Future Problem Solving competition. In Community Problem Solving, students identify a real-life need area and use the Future Problem Solving Model to address the issues. In Scenario Writing students create futuristic scenarios based on the specific topics used in the year-long program by expanding and developing a solution into a story. In the FPS competition, students, working in teams of four, examine scientific, environmental or social challenges of today by projecting these issues into the future. FPSP students and coaches vote each year to choose the broad topics to be used in the FPS and Scenario Writing competitions. The topics for 1997-98 are:

(a) Natural Disasters,
(b) Freedom,
(c) Women in the Workplace,
(d) Non-traditional Families and,
(e) Medical Ethics.

The 1998-99 topics are:

(a) Under the Sea,
(b) Computer Error,
(c) Education: Lifelong Learning,
(d) Prison Alternatives, and
(e) Distribution of Wealth.

The students work with five juried problems; the first two are practice problems, and the next three are the competition problems. The teams advance in the competition as demonstrated by their skill levels in creative and critical thinking. The assessment of a team's work using FPS evaluation procedures with feedback promotes continuous improvement and innovation. FPSP is not just a competition but a program that also enables students to learn and apply a constructive, deliberate process for solvingproblems.

The Future Problem Solving Program has affiliate programs in 40 U.S. states, Australia, and New Zealand. Seven more U.S. states, Canada, and other countries participate through the Open Division for non-affiliated programs. We hope that China will be our next frontier and that Chinese students and teachers will very soon attend the International Conference.

In preparing for the China-U.S. Conference on Education in Beijing, we had many challenges and problems to solve. The most pressing challenge was how to raise the money in order to attend the conference. This challenge represents issues, concerns, or problems that people deal with on an every day basis. Real-life issues are not problems with only one correct answer; they are challenges involving family, finances, work and school. To solve complex challenges, one must look to a process that provides a comprehensive framework

for thinking and the Future Problem Solving Program provides that framework.

The following activity shows the rapid change that has taken place in the last two or three decades and demonstrates the unpredictability of the future. By using this with a group, a rationale for teaching and using a creative problem solving process with focus on the future is shown. (Treffinger, Jackson, Jensen, & Bohnenberger, 1997).

1. Think back to when you were 15. What year was that? Write it down.
2. What are some things that 15-year old students take for granted today as ordinary or commonplace that you did not even imagine then?
3. In what year will a present day 15-year old student be the age you are now?
4. How might the world be different for that student?

In the China presentation the high school team explained the goals of FPSP using the definitions and rationales below:

1. FPS is an exciting and challenging way to become interested in our future by using creative thinking and critical analysis. Young people tend to leave the future and its troubles to someone else, but when the future arrives, we will be the ones providing leadership and we need to be prepared for whatever comes.
2. Future Problem Solving improves my written and verbal communication skills, as well as teaches me to organize my thoughts so that I get my points across more effectively. I have expanded my vocabulary by studying about the many varied topics addressed in the practices and competitions. I have learned to utilize problem solving strategies by (a) generating ideas to create solutions to solve problems in my daily life and (b) not becoming as stressed over my problems because I know that I can eventually find an effective solution.
3. Creative thinking encourages Future Problem Solvers to generate a variety of ideas. Being able to use creative thinking will help people in school and in life. Teamwork skills are enhanced as the team works together to complete the booklet of the team's work. Each member contributes something different to the final packet. These teamwork skills carry over into real life: to school, to the workplace and beyond.
4. Future Problem Solving does involve work but overall the experience is one that is worthwhile. Future Problem Solving is exciting because of the rewards for doing well in competition and being able to apply the process in our daily lives. State Bowl and the International Conference have

proved to be memorable and part of the reason why we look forward to continuing in FPSP.

The foundation tools of the Creative Problem Solving process (creative thinking and critical thinking) must both be employed for the results to be productive. Creative thinking uses the components of fluency, flexibility, elaboration and originality to arrive at unique and unusual ideas. Creative thinking invokes the Principle of Deferred Judgment, i.e., not judging while generating ideas. This is achieved by using such generating tools as brainstorming, force fitting, SCAMPER and the Morphological Matrix. Critical thinking uses the components of analysis, refining, or evaluation to address the ideas generated. Critical thinking applies the Principle of Affirmative Judgment, i.e., constructively examining the possibilities, and is achieved by using the focusing tools of evaluation and analysis to examine possibilities to enhance them. Some specific focusing tools are *Hits, Hot Spots, Highlighting, Evaluating Matrix* and *Advantages Limitations & Unique Potentials.* (Treffinger, 1994; Treffinger & Nassab, 1997).

Students need instruction in these thinking areas by either using the creative problem solving process with practice problems or by teaching the tools and steps in isolation. The integrated teaching of the tools within the process is a much stronger method. These tools can be taught through the regular curriculum or by using the practice problems offered by Future Problem Solving.

The Future Problem Solving's approach, based on the Creative Problem Solving framework, is divided into three major components:

1. Understanding the problem,
2. Generating ideas, and
3. Planning for action.

Within these components are a number of different steps. In competition the process looks and operates in a linear way, using a step by step procedure. However, in real life situations the process becomes circular. Problem solving can be thought of as a continuous circle that can be entered at any place in the circle using the components and steps as needed for the situation at hand. (Isaksen et all, 1994; Treffinger et all, 1997).

For the China presentation the AZFPS team developed the following explanations of the components and the steps.

Understanding the Problem

Researching the Topic and Analyzing the Future Scene, a hypothetical scenario on the topic, are two areas to address before problem solving starts.

(a) Research the Topic: To identify challenges and problems posed by the Future Scene, the team members must first begin by thoroughly researching the topic. The more that is known about the topic, the more likely the team can identify the challenges and create solutions that are effective,creative and relevant.

(b) Analyze the Future Scene: The team works together by thoroughly reading, analyzing and discussing the Future Scene.

The specific steps of the Future Problem Solving approach are as follows:

Step 1. Identify and Select Key Challenges: In the first formal step in Future Problem Solving, the team works to identify many varied and unusual challenges found within the Future Scene by generating facts, connections, and data from the research. Then the team elaborates on broad and specific areas by telling what the challenge is and why it is a challenge by looking at the causes and effects.

Step 2. Identify Possible Underlying Problems and Select One: The team identifies the challenge they believe to be the most significant to the situation. The team writes this Underlying Problem in question form beginning with "In what ways might we" or "How might we." These phrases make it possible to create a wide variety of solutions. The team chooses a direction to follow and states this in a positive manner and indicates the purpose or goal of their action.

Generating Ideas

Step 3. Generate and Focus Solution Ideas: After the Underlying Problem is chosen, solutionsare generated. It is important to come up with many ideas, but it is also important to remember to include who will create and carry out these ideas and how or why the plan will solve the Underlying Problem.

Planning for Action

Steps 4 & 5. Generate and select criteria: In these steps, the team generates specific criteria to evaluate which solution will best solve their Underlying Problem. Solutions are ranked on an evaluation grid to determine the best solution.

Step 6. Develop an Action Plan: Elaboration and development of the best solution into an Action Plan occur in this step. The solution is described in detail including who will carry out the plan, what the plan is, how it solves the Underlying Problem and how the plan relates back to the topic as a whole while showing a positive impact on society.

The team creates a skit-presentation to demonstrate the effectiveness of their Action Plan by elaborating on their Underlying Problem and Best Solution so that they can show their ideas to an audience in a form other than the written packet. (Treffinger et all, 1997).

At the 1997 China-U.S. Conference on Education in Beijing, the U.S. Future Problem Solvers were able to put their problem solving skills in action

when they worked with other Chinese and U.S. students in the Interactive Learning Center, the student component of the Conference. The student groups from both countries identified problems, concerns, issues or challenges occurring within the countries. Each student group examined their list, marked the common concerns and then decided which specific area to address. The areas of concern identified by the students were Equality in Education, Air Pollution, Poverty and Overcrowding. Each group created a visual model of their common problem and took pictures of the model. The pictures were scanned into the computer and placed on the Internet sites that the group developed. These projects can be viewed on the Internet sites of Interactive Learning Center (www.goodnet.com/~global/gilc.html) or FPS (www.fpsp.org/events). Unfortunately, time ran out before the student groups could generate many solutions and plan for action on their problems. The intent of the Interactive Learning Center was, by having the problems on the net site students would be able to continue to add information, solutions and action plans. However, at this time no more action has been taken, and the net site is only a viewing place for last summer's project.

The Interactive Learning Center demonstrated that students from different countries and cultures can use Future Problem Solving and work together. When students use the tools to address challenges, issues and concerns, they practice and apply many creative and critical thinking skills. Students learn to assess their thinking, and to choose appropriate practices to fit their challenges. Use of the Future Problem Solving Model takes students beyond just looking forinformation that contains one right answer. Students must use the information they have gained to generate solutions to solve their challenge. These strategies help students address the real-life challenges they face and provide a connection of the present to the future. Future Problem Solving students are solving the challenges of tomorrow— today.

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